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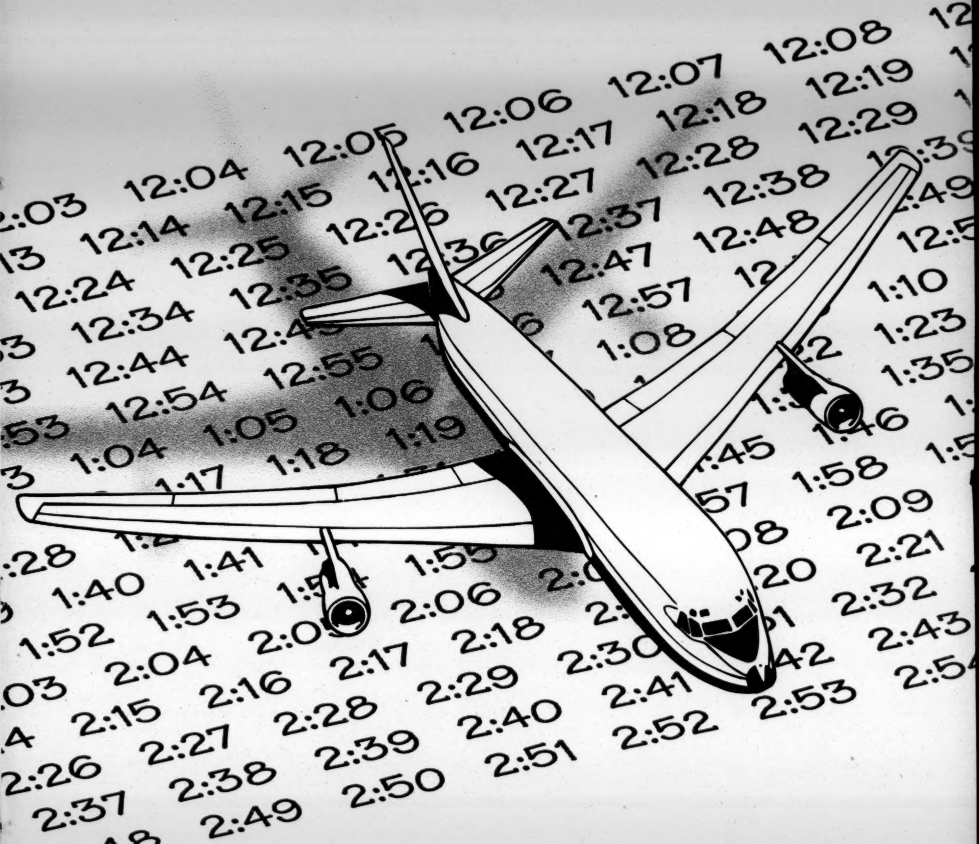
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# Real-Time Systems

*Papers on: real-time computing*
*∗ architecture for life-critical applications ∗ fault-tolerant synchronization*
*∗ scheduling algorithms ∗ rate-monotonic theory ∗ handling imprecise calculations ∗ Ada9X*
*∗ performance modeling and reliability ∗ communication protocols ∗ databases ∗ specification and analysis*
*∗ assertional reasoning*

# 1992–1994 Index
# Proceedings of the IEEE
# Vol. 80–82

This index covers all technical items — papers, correspondence, reviews, etc. — that appeared in this periodical during 1992-1994, and items from previous years that were commented upon or corrected in 1992-1994.

The Author Index contains the primary entry for each item, listed under the first author's name, and cross-references from all coauthors. The Subject Index contains several entries for each item under appropriate subject headings, and subject cross-references.

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  - hard RT systs., imprecise computations. *Liu, J.W.S., + , PROC Jan 94* 83-94
  - real-time computing, review. *Shin, K.G., + , PROC Jan 94* 6-24
  - safety-crit. real-time computer systs., archit. aspects. *Lala, J.H., + , PROC Jan 94* 25-40
- **Computer fault tolerance; cf.** Logic circuit fault tolerance
- **Computer graphics**
  - book review; Computer Graphics Handbook: Geometry and Mathematics (Mortenson, M. E.; 1990). *Tabak, Leon, PROC Jan 92* 216
- **Computer graphics software**
  - computational geometry problems in computer graphics. *Dobkin, David P., PROC Sep 92* 1400-1411
- **Computer instructions**
  - data compression arith. coding. *Howard, P.G., + , PROC Jun 94* 857-865
- **Computer interfaces**
  - fault diagnosis of power systems using knowledge-based systems. *Sekine, Yasuji, + , PROC May 92* 673-683
- **Computer interfaces, human factors**
  - natural language interface and database issues in applying expert systems to power system. *Rumpel, Dieter, + , PROC May 92* 758-764
- **Computer language processors; cf.** Compilers
- **Computer languages**
  - book review; Hermes: A Language for Distributed Computing (Strom, R. E., et al.; 1991). *Shasha, Dennis, PROC Nov 92* 1862
  - book review; Inside Smalltalk (Lalonde, W. R., and Pugh, J. R.; 1990). *Rosson, Mary Beth, PROC Mar 92* 462
  - book review; Using Formal Description Techniques - An Introduction to ESTELLE, LOTOS, and SDL (Turner, K.J., Ed.; 1993). *Tsai, T.-C., PROC Nov 94* 1763-1764
  - languages and compilers (special section). *PROC Feb 93* 209-304
  - multithreaded languages for scientific and technical computing. *Pancake, Cherri M., PROC Feb 93* 288-304
- **Computer languages; cf.** Ada; C language
- **Computer network performance**
  - modeling and analysis of computer networks. *Kleinrock, Leonard, PROC Aug 93* 1179-1191
  - packet-switched networks, real-time commun. *Aras, C.M., + , PROC Jan 94* 122-139
  - wireless data commun. systs. *Pahlavan, K., + , PROC Sep 94* 1398-1430
- **Computer networks**
  - book review; Computer Communications: A First Course (Walrand, J.; 1991). *Rao, Ramesh, PROC Jul 92* 1210
  - high-performance network and channel-based storage. *Katz, Randy H., PROC Aug 92* 1238-1261

**Computer networks; cf.** Local area networks
**Computer operating systems; cf.** Software, operating systems
**Computer performance**
  book reviews; The Art of Computer Systems Performance Analysis (Jain, R.; 1991). *Lyon, Gordon, PROC Feb 92* 332-333
  computer performance evaluation (special issue). *PROC Aug 93* 1091-1191
  storage performance metrics and benchmarks. *Chen, Peter M.*, + , *PROC Aug 93* 1151-1165
  TCM schemes, perform. eval. *Benedetto, S.*, + , *PROC Jun 94* 833-855
**Computer performance; cf.** Multiprocessing
**Computer peripherals; cf.** Disk drives
**Computer reliability; cf.** Computer fault tolerance
**Computers**
  book review; The New Hacker's Dictionary (Raymond, E., *Ed.*; 1991). *Palmer, Charles C., PROC Aug 92* 1335
**Computers; cf.** Distributed computing; Memories; Multiprocessing...; Optical computing; Parallel processing
**Computer testing; cf.** Logic circuit testing
**Computer vision; cf.** Machine vision
**Concurrency control**
  generalized rate-monotonic scheduling theory, real-time systs. develop. *Lui Sha*, + , *PROC Jan 94* 68-82
**Concurrency control; cf.** Database sysstems, concurrency operations
**Concurrent engineering**
  generalized rate-monotonic scheduling theory, real-time systs. develop. *Lui Sha*, + , *PROC Jan 94* 68-82
**Conformal antennas**
  basic array theory with emphasis on pattern analysis and synthesis for periodic linear and planar arrays, phased arrays, and conformal arrays. *Kummer, Wolfgang H., PROC Jan 92* 127-140
**Conformal antennas; cf.** Microstrip antennas
**Consumer electronics**
  consumer electronics, IC technol. driver. *Sack, E.A., PROC Apr 94* 465-468
  consumer electronics (special issue). *PROC Apr 94* 455-622
  consumer electronics, technol. directions. *Griffis, P.D.*, + , *PROC Apr 94* 459-464
**Consumer products**
  residential consumer products, networking, LANs. *Hofmann, J., PROC Apr 94* 615-622
**Contaminated land; cf.** Environmental factors
**Control engineering education**
  motion control power electronics, future perspective. *Harashima, F., PROC Aug 94* 1107-1111
**Control systems**
  medical imaging systems for feedback control of interstitial laser photocoagulation. *Wyman, Douglas R.*, + , *PROC Jun 92* 890-902
  motion control syst., simul., overview. *Mohan, N.*, + , *PROC Aug 94* 1287-1302
  motor drives, motion control, μP/digital ICs. *Hoang Le-Huy, PROC Aug 94* 1140-1163
**Control systems; cf.** Attitude controls; Current control; Digital control; Fuzzy control; Helicopter control; Industrial control; Intelligent control; Linear-quadratic control; Mechanical variables control; Motor drives; Optimal control; Pointing systems; Power control; Power system control; Process control
**Convolution**
  basefield transforms, convolution property. *Hong, J.*, + , *PROC Mar 94* 400-412
**Convolutional coding; cf.** Tree coding
**Correlation**
  random no. sets, probab. theory, engng. models. *Johnson, G.E., PROC Feb 94* 270-285
**Correlators**
  opt. pattern recogn. image proc., general-purpose. *Casasent, D., PROC Nov 94* 1724-1734
  Very Long Baseline Array characts. *Napier, P.J.*, + , *PROC May 94* 658-672
**Cosine transforms**
  comparative review, real/complex Fourier-related transforms. *Ersoy, O.K., PROC Mar 94* 429-447
  video/image compression, opt. computing techs. *Yoshida, A.*, + , *PROC Jun 94* 948-954
**Cosine transforms; cf.** Discrete cosine transforms
**Coupling; cf.** Electromagnetic coupling
**Covariance analysis**
  random no. sets, probab. theory, engng. models. *Johnson, G.E., PROC Feb 94* 270-285
**Crosstalk**
  SS technol. for commercial appls., review. *Magill, D.T.*, + , *PROC Apr 94* 572-584
**Cryogenic electronics**
  MM-wave SIS receivers characts. for radiotelescopes. *Payne, J.M.*, + , *PROC May 94* 811-823
  S/X low-noise prime-focus receiver syst. for radio astron. *Norrod, R.D.*, + , *PROC May 94* 768-775
**Crystal resonators; cf.** Piezoelectric resonators
**Current control**
  induction motors, motion control. *Lorenz, R.D.*, + , *PROC Aug 94* 1215-1240

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**Database systems; cf.** Information systems; Object-oriented databases
**Database systems, concurrency operations**
  real-time databases, concurrency control and scheduling. *Yu, P.S.*, + , *PROC Jan 94* 140-157
**Database systems, scheduling**
  real-time databases, concurrency control and scheduling. *Yu, P.S.*, + , *PROC Jan 94* 140-157
**Data buses**
  OE multiple-access buses, high-perform. computing. *Chiarulli, D.M.*, + , *PROC Nov 94* 1701-1710
  opt. free-space multiple-access mesh-connected bus interconnects. *Li, Y.*, + , *PROC Nov 94* 1690-1700
**Data communication**
  book review; Data Communications Principles (Gitlin, R.O., et al.; 1992). *Kurzweil, J., PROC Apr 94* 623-624
  free-space digital opt. systs., five switching fabric demonstrators. *Hinton, H.S.*, + , *PROC Nov 94* 1632-1649
  multiple access in wireless digital networks. *Abramson, N., PROC Sep 94* 1360-1370
  packet switches, photonic, archits. and expt. implements. *Blumenthal, D.J.*, + , *PROC Nov 94* 1650-1667
  sens. modality technols. for multimedia commun. *Flanagan, J.L., PROC Apr 94* 590-603
  wireless data commun. systs. *Pahlavan, K.*, + , *PROC Sep 94* 1398-1430
**Data communication; cf.** Computer networks; Data buses; Integrated services digital networks; Land mobile radio data communication; Local area networks; Multiaccess communication; Multiprocessing, interconnection
**Data compression**
  arith. coding, table lookup. *Howard, P.G.*, + , *PROC Jun 94* 857-865
  comparative review, real/complex Fourier-related transforms. *Ersoy, O.K., PROC Mar 94* 429-447
  data compression (special section). *PROC Jun 94* 856-954
  digital TV, review. *Anastassiou, D., PROC Apr 94* 510-519
  Lempel-Ziv sliding-window data compression algm., asymptotically optimal. *Wyner, A.D.*, + , *PROC Jun 94* 872-877
  lossless still image compression, comparison of internat. stds. *Arps, R.B.*, + , *PROC Jun 94* 889-899
  rewritable MiniDisc syst. for audio recording and removable data storage. *Yoshida, T., PROC Oct 94* 1492-1500
  speech/audio compression, CELP, subband and transform coding techs. *Gersho, A., PROC Jun 94* 900-918
  split-merge video displacement estim. *Carpentieri, B.*, + , *PROC Jun 94* 940-947
  textual image compression, two-stage lossy/lossless encoding. *Witten, I.H.*, + , *PROC Jun 94* 878-888
  Ziv-Lempel proof, data compression. *Sheinwald, D., PROC Jun 94* 866-871
**Data compression; cf.** Image coding; Source coding
**Data processing**
  fault diagnosis of power systems using knowledge-based systems. *Sekine, Yasuji*, + , *PROC May 92* 673-683
**Data storage; cf.** Memories
**Data structures**
  dynamic algorithms and data structures in computational geometry. *Chiang, Yi-Jen*, + , *PROC Sep 92* 1412-1434
**Data transmission; cf.** Data communication
**DC motors; cf.** Road vehicle electric propulsion
**DCT; cf.** Discrete cosine transforms
**Decision-making; cf.** Bayes procedures; Signal detection
**Definitions; cf.** Terminology
**Demodulation; cf.** Modulation/demodulation
**Design automation**
  automated conversion of engineering drawings to CAD form. *Filipski, Alan J.*, + , *PROC Jul 92* 1195-1209
  book review; Design Theory and Computer Science (Dasgupta, S.; 1991). *Chandrasekaran, B., PROC Aug 92* 1336-1337
  design methodology mgt. *Kleinfeldt, S.*, + , *PROC Feb 94* 231-250

**Design automation; cf.** Layout...

**Design automation software**
- embedded computer systs., hardware-software co-design. *Wolf, W.H., PROC Jul 94* 967-989

**Design methodology**
- design methodology mgt. *Kleinfeldt, S., +, PROC Feb 94* 231-250
- electronic equipt. reliab. predictions; design, develop. *Pecht, M.G., +, PROC Jul 94* 992-1004
- OEIC time-of-flight design, all-opt. stored-program digital computer implement. *Jordan, H.F., +, PROC Nov 94* 1679-1689
- organization and research results of the NSF Engineering Design Research Center at Carnegie Mellon University; two case studies. *Demes, Georgette H., +, PROC Jan 93* 10-24

**Design methodology; cf.** Integrated circuit design; Radio broadcast receivers

**Detection; cf.** Buried-object detection; Fault diagnosis; Signal detection

**Device reliability; cf.** Component reliability

**DFT; cf.** Discrete Fourier transforms

**Diagnosis; cf.** Fault diagnosis

**Diathermy; cf.** Hyperthermia

**Dielectric breakdown**
- HV nanosecond pulse power systems; review. *Martin, John Christopher, PROC Jun 92* 934-945

**Dielectric breakdown; cf.** Electrostatic discharges

**Dielectric films; cf.** Plastic films

**Dielectric heating; cf.** Hyperthermia

**Dielectric waveguides**
- novel transmission lines for submillimeter-wave region. *Katehi, Linda P. B., PROC Nov 92* 1771-1787

**Diffraction; cf.** Electromagnetic diffraction; Geometrical diffraction theory; Physical theory of diffraction

**Digital communication**
- American digital HDTV terrestrial broadcasting syst. *Hopkins, R., PROC Apr 94* 554-563
- evolution scenarios for optical telecommunication networks using multiwavelength transmission. *Smith, Phil J., +, PROC Nov 93* 1580-1587
- key technologies for flexible digital optical transport. *Miki, Tetsuya, PROC Nov 93* 1594-1609
- obstacles encountered in developing 10-Gb/s lightwave systems. *Heidemann, Rolf, +, PROC Nov 93* 1558-1567
- TV, review. *Anastassiou, D., PROC Apr 94* 510-519
- very-high-speed optical signal processing for future terabit/second lightwave systems. *Shimada, Sadakuni, +, PROC Nov 93* 1633-1646

**Digital communication; cf.** Coding/decoding; Digital radio; Integrated services digital networks; Source coding

**Digital computers; cf.** Computers

**Digital control**
- book review; Computer Systems for Automation and Control (Olsson, G., and Piani, G.; 1992). *Toumodge, S., PROC Jun 94* 956-957
- book review; Transputers in Real-Time Control (Irvin, G.W., and Fleming, P.J., Eds.; 1992). *Toumodge, S., PROC Jul 94* 1096
- evolution of controllers that interface disk drive devices and subsystems with their hosts. *Hospodor, Andrew D., +, PROC Apr 93* 586-594

**Digital filters**
- high-speed signal processing in state estimation system identification and time-series modeling, and control system design using unified approach. *Goodwin, Graham C., +, PROC Feb 92* 240-259
- order statistics in digital image processing. *Pitas, Ioannis, +, PROC Dec 92* 1893-1921

**Digital filters; cf.** Adaptive filters; Median filters

**Digital image processing; cf.** Image processing

**Digital integrated circuits**
- motor drives, motion control, µP/digital ICs. *Hoang Le-Huy, PROC Aug 94* 1140-1163

**Digital integrated circuits; cf.** Bipolar integrated circuits

**Digital modulation/demodulation; cf.** Phase-shift keying

**Digital radio**
- cellular networks, radio link traffic engng. *Everitt, D.E., PROC Sep 94* 1371-1382
- GSM radio subsystem, perform. aspects. *Fuhrmann, W.F., +, PROC Sep 94* 1449-1466
- multiple access in wireless digital networks. *Abramson, N., PROC Sep 94* 1360-1370
- SS technol. for commercial appls., review. *Magill, D.T., +, PROC Apr 94* 572-584

**Digital recording**
- book review; Coding Techniques for Digital Recorders (Schouhamer-Immink, K. A.; 1991). *Ferreira, H. C., PROC Dec 92* 2007-2008
- diode lasers for mass market appls., opt. recording/printing. *Carlin, D.B., +, PROC Apr 94* 469-481

**Digital recording; cf.** CD recording

**Digital signal processing chips**
- motor drives, motion control, µP/digital ICs. *Hoang Le-Huy, PROC Aug 94* 1140-1163

**Digital system testing**
- book review; Digital Systems Testing and Testable Design (Abramovici, M. B., and Friedman, A.; 1990). *Wagner, K. D., PROC Jan 92* 218-219

**Digital transmission; cf.** Digital communication

**Diode lasers; cf.** Semiconductor lasers

**Diodes**
- production and investigation of terawatt proton beams from annular diode using strong radial magnetic insulation fields and preformed anode plasma source. *Bluhm, Hans J., +, PROC Jun 92* 995-1009
- theory of instability-generated divergence of intense ion beams from applied-B ion diodes. *Quintenz, Jeffrey P., +, PROC Jun 92* 971-984

**Diodes; cf.** Semiconductor diodes

**Dipole arrays**
- frequency-independent antennas and their broadband derivatives. *Mayes, Paul E., PROC Jan 92* 103-112

**Direction-of-arrival estimation**
- subspace-based signal analysis using singular value decomposition. *Van Der Veen, Alle-Jan, +, PROC Sep 93* 1277-1308

**Discrete cosine transforms**
- comparative review, real/complex Fourier-related transforms. *Ersoy, O.K., PROC Mar 94* 429-447

**Discrete Fourier transforms**
- basefield transforms, convolution property. *Hong, J., +, PROC Mar 94* 400-412
- comparative review, real/complex Fourier-related transforms. *Ersoy, O.K., PROC Mar 94* 429-447

**Discrete Hartley transforms**
- basefield transforms, convolution property. *Hong, J., +, PROC Mar 94* 400-412

**Discrete-time filters; cf.** Digital filters

**Discrete transforms; cf.** Discrete cosine transforms; Discrete Fourier transforms; Discrete Hartley transforms

**Disk drives**
- evolution of controllers that interface disk drive devices and subsystems with their hosts. *Hospodor, Andrew D., +, PROC Apr 93* 586-594

**Disk recording; cf.** CD recording; Disk drives; Magnetic disk recording

**Dispatching; cf.** Power generation dispatch

**Dispersive media; cf.** Electromagnetic propagation, dispersive media

**Displays; cf.** Computer graphics; Flat panel displays; Light-emitting diode displays; Liquid-crystal displays; Plasma displays; TV displays

**Displays, human factors**
- HDTV displays, direct-view CRTs and projection systs. *Gorog, I., PROC Apr 94* 520-536

**Distortion**
- perceptual coding based on model of distortion masking and human perception. *Jayant, Nikil, +, PROC Oct 93* 1385-1422

**Distortion; cf.** Crosstalk

**Distributed computing**
- book review; Hermes: A Language for Distributed Computing (Strom, R. E., et al.; 1991). *Shasha, Dennis, PROC Nov 92* 1862
- generalized rate-monotonic scheduling theory, real-time systs. develop. *Lui Sha, +, PROC Jan 94* 68-82
- real-time systs., sync. issues. *Suri, N., +, PROC Jan 94* 41-54

**Distributed memories**
- compiling for distributed-memory systems. *Zima, Hans P., +, PROC Feb 93* 264-287
- high-performance network and channel-based storage. *Katz, Randy H., PROC Aug 92* 1238-1261

**Distributed-reflector lasers**
- recent developments in advanced semiconductor lasers. *Suematsu, Yasuharu, +, PROC Mar 92* 383-397

**Diversity methods**
- polariz. diversity lidar, cloud remote sensing, advances. *Sassen, K., PROC Dec 94* 1907-1914
- results from 12- to 30-GHz German site-diversity propagation experiments carried out with radiometers and OLYMPUS satellite. *Dintelmann, Fritz, +, PROC Jun 93* 876-884
- site diversity for satellite earth terminals; radiometric attenuation measurements at 28 GHz. *Lin, Kuan-Ting, +, PROC Jun 93* 897-904

**DOA estimation; cf.** Direction-of-arrival estimation

**Documentation**
- book review; How to Write Usable User Documentation (Weiss, E. H.; 1991). *Barker, Thomas T., PROC Jan 93* 153-154
- book review; Illustrating Computer Documentation: The Art of Presenting Information Graphically on Paper and Online (Horton, W. K.; 1991). *Brockmann, R. John, PROC Jan 93* 152-153
- book review; The Art of Technical Documentation (Haramundanis, K.; 1992). *Sims, Brenda R., PROC Sep 93* 1361

- **Document handling**
  - argument for change of approach to OCR research. *Nagy, George, PROC Jul 92* 1093-1100
  - conceptual framework for document analysis. *Schürmann, Jürgen, + , PROC Jul 92* 1101-1119
  - major components and performance of complete text reading system. *Tsujimoto, Shuichi, + , PROC Jul 92* 1133-1149
  - pattern-oriented segmentation method that leads to document structure analysis. *Fujisawa, Hiromichi, + , PROC Jul 92* 1079-1092
- **Doppler radar**
  - bistatic dual-Doppler radar deisgn, vector winds retrieval, one transmitter and remote low-gain passive receiver. *Wurman, J., + , PROC Dec 94* 1861-1872
  - ELDORA/ASTRAIA airborne Doppler weather radar, design and field testing. *Hildebrand, P.H., + , PROC Dec 94* 1873-1890
- **Drives; cf.** Motor drives
- **Dyadic analysis; cf.** Green's functions

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- **Economics; cf.** Communication system economics; Computer economics; Integrated circuit economics; Power generation economics
- **Eddy currents**
  - theory and applications of eddy currents. *Kriezis, E. E., + , PROC Oct 92* 1559-1589
- **Educational technology; cf.** Training
- **EEPROM (electrically erasable programmable ROM); cf.** Read-only memories
- **Electrical engineering**
  - comments, with reply, on 'Planetary influences on electrical engineering' by R. N. Bracewell. *Powell, C. Spencer, PROC Apr 93* 631 (Original paper, Feb 92 230-237)
- **Electrical engineering; cf.** Biographies; Engineering profession
- **Electrical engineering education; cf.** Control engineering education; Power engineering education
- **Electric automobiles; cf.** Road vehicle electric propulsion
- **Electric utilities; cf.** Power industry
- **Electric variables control; cf.** Current control
- **Electrochemical devices; cf.** Batteries; Fuel cells
- **Electromagnetic analysis; cf.** Antennas
- **Electromagnetic coupling**
  - basic theory of quasi-optical Gaussian beam propagation, transformation, and coupling; design guidelines and components for Gaussian optics systems. *Goldsmith, Paul F., PROC Nov 92* 1729-1747
- **Electromagnetic diffraction**
  - UHF propag. prediction for wireless pers. communs. *Bertoni, H.L., + , PROC Sep 94* 1333-1359
- **Electromagnetic diffraction; cf.** Geometrical diffraction theory; Optical diffraction; Physical theory of diffraction
- **Electromagnetic forces; cf.** Electromagnetic launching
- **Electromagnetic heating; cf.** Hyperthermia
- **Electromagnetic interference, radiated**
  - interference due to hydrometeor scatter on satellite communication links. *Olsen, R. L., + , PROC Jun 93* 914-922
- **Electromagnetic launching**
  - theory and applications of eddy currents. *Kriezis, E. E., + , PROC Oct 92* 1559-1589
- **Electromagnetic measurements; cf.** Antenna measurements; Millimeter-wave measurements; Optical measurements; Probe antennas
- **Electromagnetic propagation**
  - consequences of parameterization of fractal set on its electrodynamics. *Méhauté, Alain Le, + , PROC Oct 93* 1500-1510
- **Electromagnetic propagation; cf.** Radio propagation; Underground electromagnetic propagation
- **Electromagnetic propagation, absorbing media; cf.** Microwave radio propagation meteorological factors
- **Electromagnetic propagation, dispersive media**
  - comments, with reply, on 'Pulse propagation in a linear, causally dispersive medium' by K. E. Oughstun. *Luebbers, Raymond, + , PROC Apr 93* 631-639 (Original paper, Oct 91 1379-1390)
- **Electromagnetic pulse; cf.** EMP radiation effects
- **Electromagnetic radiation**
  - role of astronomy in development of electromagnetic theory. *Bracewell, Ronald N., PROC Feb 92* 230-237
- **Electromagnetic radiation; cf.** Antennas
- **Electromagnetic radiation effects**
  - Robert H. Marriott and radio hazards (Scanning the Past). *Brittain, James E., PROC Feb 92* 335
- **Electromagnetic radiation effects; cf.** Biomedical radiation applications, electromagnetic; Electromagnetic interference, radiated; EMP radiation effects
- **Electromagnetic scattering**
  - asymptotic and hybrid techniques for electromagnetic scattering. *Bouche, Daniel P., + , PROC Dec 93* 1658-1684
- **Electromagnetic scattering; cf.** Electromagnetic diffraction; Geometrical diffraction theory; Optical scattering; Physical theory of diffraction; Radar scattering; Sea surface electromagnetic scattering
- **Electromagnetic scattering, absorbing media; cf.** Biomedical radiation applications, electromagnetic
- **Electromagnetic scattering, nonhomogeneous media**
  - interference due to hydrometeor scatter on satellite communication links. *Olsen, R. L., + , PROC Jun 93* 914-922
- **Electromagnetic scattering, nonhomogeneous media; cf.** Loaded scatterers
- **Electromagnetic shielding; cf.** EMP radiation effects
- **Electromagnets; cf.** Magnetic levitation
- **Electromigration; cf.** Integrated circuit reliability
- **Electron accelerators**
  - high-power, short-pulse generators based on induction voltage adders. *Ramirez, Juan J., + , PROC Jun 92* 946-957
- **Electron beams; cf.** Electron accelerators; Free-electron lasers
- **Electron guns**
  - vac. microelectronic devices, review. *Brodie, I., + , PROC Jul 94* 1006-1034
- **Electronic equipment**
  - EMP research and impact on high-power electromagnetics. *Baum, Carl E., PROC Jun 92* 789-817
- **Electronics; cf.** Consumer electronics; Cryogenic electronics; Power electronics; Ultrafast electronics
- **Electronics industry**
  - questionable US ability to manufacture thin-film multichip modules. *Balde, John W., PROC Dec 92* 1995-2002
- **Electron tubes**
  - work of Herbert J. Reich (Scanning the Past). *Brittain, James E., PROC Jun 92* 1022
- **Electrooptic materials/devices; cf.** Integrated optoelectronics; Self-electrooptic-effect devices
- **Electrostatic discharges**
  - electromigration, hot carrier effects, CMOS latchup, ESD, and environmental factors issues in advanced VLSI design-in reliability. *Yang, Ping, + , PROC May 93* 730-744
  - electrostatic discharge as reliability threat to VLSI circuits. *Duvvury, Charvaka, + , PROC May 93* 690-702
- **EMP radiation effects**
  - EMP research and impact on high-power electromagnetics. *Baum, Carl E., PROC Jun 92* 789-817
- **Energy management**
  - multiagent organizations for real-time operations. *Talukdar, Sarosh, + , PROC May 92* 765-778
- **Energy resources; cf.** Wind energy
- **Energy storage; cf.** Batteries; Flywheels
- **Engineering; cf.** Electrical engineering; RD&E
- **Engineering drawings**
  - automated conversion of engineering drawings to CAD form. *Filipski, Alan J., + , PROC Jul 92* 1195-1209
- **Engineering education; cf.** Control engineering education; Power engineering education
- **Engineering profession**
  - Arthur F. Van Dyck and use of dynamic symmetry in radio design (Scanning the Past). *Brittain, James E., PROC Sep 92* 1519
  - career and achievements of Harry Diamond (Scanning the Past). *Brittain, James E., PROC Sep 93* 1362
  - career of Alfred N. Goldsmith (Scanning the Past). *Brittain, James E., PROC Aug 93* 1194-1196
  - career of Frederick B. Llewellyn (Scanning the Past). *Brittain, James E., PROC Nov 93* 1650
  - career of Harold H. Beverage (Scanning the Past). *Brittain, James E., PROC Dec 93* 1789
  - career of Louis Alan Hazeltine (Scanning the Past). *Brittain, James E., PROC Apr 93* 646
  - career of Louis W. Austin, researcher in radio wave propagation (Scanning the Past). *Brittain, James E., PROC Mar 93* 486
  - career of Thelma Estrin, who pioneered application of computing in biomedical engineering. *Nebeker, Frederik, PROC Oct 93* 1370-1382
  - Charles Stewart Ballantine, career and contribs. *Brittain, J.E., PROC Jul 94* 1098
  - contributions of Albert W. Hull to vacuum tube technology (Scanning the Past). *Brittain, James E., PROC Feb 93* 310
  - contributions of John Howard Dellinger (Scanning the Past). *Brittain, James E., PROC May 93* 790

contributions of Karl G. Jansky (Scanning the Past). *Brittain, James E., PROC Oct 93* 1538
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George A. Campbell and electric wave filter (Scanning the Past). *Brittain, James E., PROC May 92* 782
Guglielmo Marconi's contributions to wireless communication (Scanning the Past). *Brittain, James E., PROC Aug 92* 1341-1342
Haraden Pratt, career and contribs. *Brittain, J.E., PROC May 94* 826
Hendrik van der Bijl, career and contribs. *Brittain, J.E., PROC Apr 94* 626
Joseph Warren Horton, career and contribs. *Brittain, J.E., PROC Sep 94* 1470
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M.J. Kelly and A.L. Samuel, career and contribs. *Brittain, J.E., PROC Nov 94* 1766
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Vladimir K. Zworykin, career and contribs. *Brittain, J.E., PROC Jan 94* 186
William L. Everitt, career and contribs. *Brittain, J.E., PROC Feb 94* 306
Wilmer L. Barrow, career and contribs. *Brittain, J.E., PROC Aug 94* 1326
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**Engineering profession; cf.** Biographies
**Engineering writing; cf.** Writing
**Entropy**
Lempel-Ziv sliding-window data compression algm., asymptotically optimal. *Wyner, A.D., +, PROC Jun 94* 872-877
**Environmental factors**
contaminated lands, environ. charactn. using magnetometry. *Foley, J.E., PROC Dec 94* 1823-1834
**Environmental factors; cf.** Integrated circuit reliability
**Environmental radiation effects; cf.** Radioactive pollution
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**Interconnected systems; cf.** Large-scale systems

**Interconnection networks; cf.** Multiprocessing, interconnection

**Interconnections, integrated circuits; cf.** Integrated circuit interconnections

**Interference; cf.** Electromagnetic interference, radiated

**Interference suppression**
- Owens Valley 5.5-m telescope, ground spillover reduction. *Lawrence, C.R., +, PROC May 94* 763-767

**Interferometry; cf.** Radar interferometry

**Internat. Consultative Ctte. for Telephone & Telegraph; cf.** CCITT

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**Josephson mixers; cf.** Superconductor–insulator–superconductor mixers

**Junction lasers; cf.** Semiconductor lasers

**K**

**Knowledge-based systems; cf.** Expert systems

**L**

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**Laser amplifiers; cf.** Semiconductor optical amplifiers

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  - quantum electronics (special issue). *PROC Mar 92* 339-460
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  - physics and characteristics of tunable solid-state lasers. *Moulton, Peter F., PROC Mar 92* 348-364
- **Latchup; cf.** Integrated circuit reliability
- **Launching; cf.** Electromagnetic launching
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  - architecture and requirements for high-performance reading machines; automatic mail sorting application. *Srihari, Sargur N., PROC Jul 92* 1120-1132
  - experimental printed-page reader that is easily adapted to various languages. *Baird, Henry S., PROC Jul 92* 1059-1065
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- **Layout, integrated circuits**
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  - recent developments in waveguide-based, microstrip, and integrated antennas. *Schwering, F. K., PROC Jan 92* 92-102
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- **Lenses**
  - camcorder technol., develops. *Kubota, Y., + , PROC Apr 94* 537-543
- **Levitation; cf.** Magnetic levitation
- **Lidar; cf.** Laser radar
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  - blue/green diode lasers, wide-bandgap II-VI semiconds. appls. *Gunshor, R.L., + , PROC Oct 94* 1503-1513
  - flat-panel displays, evol. *Tannas, L.E., Jr., PROC Apr 94* 499-509
- **Linear accelerators; cf.** Ion linear accelerators
- **Linear algebra; cf.** Matrices
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  - array pattern control and synthesis. *Hansen, R. C., PROC Jan 92* 141-151
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  - signal modeling techniques in speech recognition. *Picone, Joseph W., PROC Sep 93* 1215-1247
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  - high-speed signal processing in state estimation system identification and time-series modeling, and control system design using unified approach. *Goodwin, Graham C., + , PROC Feb 92* 240-259
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  - HDTV displays, direct-view CRTs and projection systs. *Gorog, I., PROC Apr 94* 520-536
- **Liquids; cf.** Fluids
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- **Locomotion systems; cf.** Legged locomotion
- **Logarithmic amplifiers**
  - GaAs HBTs for analog circuits. *Oyama, Bert K., + , PROC Dec 93* 1744-1761
- **Logic**
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- **Logic; cf.** Fuzzy logic
- **Logic arrays**
  - P-OPALS pure opt.-parallel array logic syst. *Tanida, J., + , PROC Nov 94* 1668-1677
- **Logic arrays; cf.** Cellular logic arrays; Programmable logic arrays
- **Logic circuit design; cf.** Integrated circuit design
- **Logic circuit fault diagnosis**
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- **Logic circuit fault tolerance**
  - survey of fault tolerance techniques applied to VLSI technology. *Peercy, Michael, + , PROC May 93* 745-758
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- **Log-spiral antennas**
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**Magnetic measurements; cf.** Magnetometers
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**Magnetic recording; cf.** Magnetic disk recording; Magnetic tape recording; Magnetooptic recording
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**Microwave bipolar transistor amplifiers**
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Haystack radiotelescope upgrade for operation, 115 GHz. *Ingalls, R.P., +, PROC May 94* 742-755
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Nobeyama 45-m telescope, surface accuracy of 65 μm. *Ukita, N., +, PROC May 94* 725-733
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**Millimeter-wave FET amplifiers**
FET oscillator and amplifier grids for quasi-optical millimeter- and submillimeter-wave power combining. *Weikle, Robert M., II, +, PROC Nov 92* 1800-1809

**Millimeter-wave FET amplifiers, power; cf.** MODFET amplifiers, power

**Millimeter-wave FET oscillators**
FET oscillator and amplifier grids for quasi-optical millimeter- and submillimeter-wave power combining. *Weikle, Robert M., II, +, PROC Nov 92* 1800-1809

**Millimeter-wave frequency conversion**
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**Millimeter-wave frequency conversion; cf.** Millimeter-wave mixers

**Millimeter-wave integrated circuits**
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**Millimeter-wave measurements**
DSN precision radiometer systs. and microwave calib. *Stelzried, C.T., +, PROC May 94* 776-787

**Millimeter-wave measurements; cf.** Millimeter-wave radiometry; Millimeter-wave spectroscopy

**Millimeter-wave mixers**
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**Millimeter-wave oscillators; cf.** Millimeter-wave FET oscillators

**Millimeter-wave power dividers/combiners**
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**Millimeter-wave radar**
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**Millimeter-wave radiometry**
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**Millimeter-wave receivers**
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**Millimeter-wave technology**
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**Mixers; cf.** Millimeter-wave mixers; Schottky diode mixers; Submillimeter-wave mixers; Superconductor-insulator-superconductor mixers

**MMICs**
- subMM nonlin. wave propag. devices in ultrafast optoelectronics. *Rodwell, M.J.W., + , PROC Jul 94* 1037-1059

**Modeling**
- book review; An Introduction to the Modeling of Neural Networks (Peretto, P.; 1992). *Palmer, R.G., PROC Oct 94* 1583-1584

**Modeling; cf.** Geometric modeling; Semiconductor device modeling; *Specific topic*

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**MODFET amplifiers, power**
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**Modulation coding; cf.** Trellis-coded modulation

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- hybrid methods using moment methods for radiating antenna system proximity analysis; overview. *Thiele, Gary A., PROC Jan 92* 66-78
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**MOSFET switches**
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**MOS integrated circuits; cf.** CMOS integrated circuits

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- split-merge video displacement estim. *Carpentieri, B., + , PROC Jun 94* 940-947

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- AC ASD, motion control syst., param. estim./ident. *Ohnishi, K., + , PROC Aug 94* 1253-1265
- elec. machines, motion control, converters. *Van Wyk, J.D., PROC Aug 94* 1164-1193
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- motion control, µP/digital ICs. *Hoang Le-Huy, PROC Aug 94* 1140-1163
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**Motor drives; cf.** AC motor drives

**Motors; cf.** Permanent magnet motors

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- interactive multimedia cable TV systs. in United States in 1990s. *Miller, M.D., PROC Apr 94* 585-589
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**Signal sampling/reconstruction; cf.** Analog–digital conversion; Image reconstruction

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**Smoothing methods; cf.** Median filters

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- ParaScope parallel programming environment; parallel debugging. *Cooper, Keith D., + , PROC Feb 93* 244-263

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